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| EXAMINER | |
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| RICHEY, SCOTT M | |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/532,453 | HEINZ ET AL. | |
| | Examiner | Art Unit | |
| | Scott M. Richey | 2877 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *16 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-47* is/are pending in the application.

4a) Of the above claim(s) *22,23,28,29 and 34-36* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21,24-27,30-33 and 37-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 April 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/22/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

The applicant's amended claims, filed July 26, 2007, have been entered. The restriction requirement of June 26, 2007, in view of the amended claims, has been withdrawn.

### *Specification*

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### *Claim Objections*

Claims 18, 20, 21, 24, and 40 are objected to because of the following informalities:

Claim 18 lacks clarity, containing the limitation, "one or more conductive paths connecting the input electrodes and the output electrodes to the areas of photoconductive material to form a series circuit." It is unclear how multiple input electrodes and multiple output electrodes, which are separate from the input electrodes, can form a series circuit. From the specification, and especially the figures, it appears that the applicant may have intended that circuits are each formed as an input, an area,

and an output, and that multiple circuits combined are combined in parallel. Further, it is unclear how many electrodes are present for the case of one area. In light of the specification, it appears that in the singular case, the circuit consists of one input and one output.

Claim 20 appears to contain a typographical error, missing a verb: "The device of claim 18, the electronics connected to the source and configured to modulate the source so that current is modulated through the areas at a desired frequency, to improve signal to noise." The claim as set forth is unclear, but may have intended --*The device of claim 18, the electronics are connected to the source and configured to modulate the source so that current is modulated through the areas at a desired frequency, to improve signal to noise.*--.

Claim 21 appears to contain a typographical error, missing a verb: "The device of claim 18, the detector, source and electronics configured to provide a four point measurement." The claim as set forth is unclear, but may have intended --*The device of claim 18, the detector, source and electronics are configured to provide a four point measurement.*--.

Claim 24 appears to contain a typographical error: "at second ends of the **array of** optical fibers." This limitation was amended in other parts of the claims to read: --*at second ends of ~~array of~~ the optical fibers*--. If this is a new limitation, it lacks antecedence.

Claim 40 appears to contain typographical errors. The claim contains several instances of the limitation "active areas." This limitation was amended in other parts of

the claims to --~~active~~ areas--. The device of claim 18, the areas of photoconductive material comprising at least three **active areas**, wherein a first one of the **active areas** separates a first of the input electrodes from a first of the output electrodes, and wherein a second one of the **active areas** separates a second of the input electrodes from a second of the output electrodes, such that current flows from the first input electrode through the **active area** and to the second input electrode, such that the first input and output electrodes do not short-circuit, and such that the second input and output electrodes do not short-circuit.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 33 and 43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite in that it fails to point out what is included or excluded by the claim language.

Claim 33 is an omnibus type claim.

Claim 43 is unclear because it fails to qualify what constitutes "optimal alignment," and with respect to what these "two objects" are aligned. While the claim does state that interference or diffraction is dependent on a distance, it omits what is interfering or diffracting the light. Further, it is unclear how driving current through the photodetector can align two remote objects because the claims as set forth provide no relationship between the two remote objects and the sensors.

***Claim Rejections - 35 USC § 102***

APPARATUS CLAIMS MUST BE STRUCTURALLY DISTINGUISHABLE FROM THE PRIOR ART

While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. Limitations following "adapted for," "designed to," "can be," "capable of," "wherein," and "whereby" or are statements of intended use are not positive limitations and thus are not given patentable weight. See MPEP 2111.04. Specifically, this occurs in:

- Claim 43 –" wherein the incident optical radiation comprises an interference or diffraction pattern dependent upon a distance between two objects, etc."

It appears that, in claim 1, the applicant may be attempting to invoke 35 U.S.C. 112, sixth paragraph. However, the claim as set forth fails to further limit as provided by the statute. See MPEP 2181 I. Specifically:

> A claim limitation will be presumed to invoke 35 U.S.C. §112, sixth paragraph, if it meets the following 3-prong analysis:
> (A) the claim limitation must use the phrase "means for" or "step for,"
> (B) the "means for" or "step for" must be modified by functional language; and
> (C) the phrase "means for" or "step for" must not be modified by sufficient structure, material, or acts for achieving the specified function.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. §102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 4,079,422 to Anagnostopoulos.**

Anagnostopoulos discloses a method for detecting changes in a spatially nonuniform optical intensity distribution, comprising:

(Claim 1) driving current through one or more areas of photoconductive material of a detector (Fig.2a, 12), by means of one pair of electrical contacts to source and sink the current (X, Y), while incident optical radiation illuminates one or more of the areas of photoconductive material (col.1, ln.39-51); and measuring voltage across one or more of the areas, a change in the voltage being indicative of a change in illumination (12);

(Claim 2) wherein measuring the voltage comprises utilizing an observation instrument (12).

**Claims 7-17 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 5,793,357 to Ivey et al. hereinafter "Ivey."**

Ivey discloses a method for detecting changes in a spatially nonuniform optical intensity distribution, comprising: driving current through one or more areas of photoconductive material of a detector (Fig.15), by means of one pair of electrical contacts to source and sink the current, while incident optical radiation illuminates one or more of the areas of photoconductive material (Fig.15); and measuring voltage across one or more of the areas, a change in the voltage being indicative of a change in illumination (Fig.15; col.2, ln.33-44);

(Claim 7) further comprising determining motion of an object surface that causes the change in illumination (col.2, ln.33-44);

(Claim 8) wherein determining motion comprises analyzing the voltage in a time domain (Fig.15; col.9, ln.8-17);

(Claim 9) wherein determining motion comprises analyzing the voltage in a frequency domain (col.9, ln.8-17; This is just a mathematical transform, and therefore contains equivalent physical knowledge as in claim 8.);

(Claim 10) further comprising: illuminating the surface with a laser having a wavelength that is smaller than defined geometric features of the surface (col.1, ln.36, "rough") such that moving speckle indicative of surface motion illuminates the areas of photoconductive material while the current is driven through the areas of photoconductive material (col.2, ln.33-44); and wherein surface motion is determined by sensing voltage across one or more of the areas of photoconductive material (Fig.15; col.2, ln.33-44);

(Claim 11) wherein sensing voltage comprises determining voltage signals in a time-domain (Fig.15; col.9, ln.8-17);

(Claim 12) wherein sensing voltage comprises determining voltage signals in a frequency-domain (col.9, ln.8-17; This is just a mathematical transform, and therefore contains equivalent physical knowledge as in claim 11.);

(Claim 13) wherein the motion of the object surface comprises surface displacement (col.2, ln.22-44, "movement");

(Claim 14) wherein illuminating the surface comprises generating an interference pattern that varies with surface motion and detecting the interference pattern by (col.2, ln.33-44): driving current through one or more of the areas of a photoconductive material while the interference pattern illuminates the areas of photoconductive material (Fig.15); and sensing voltage across one or more of the areas of photoconductive material to detect surface motion (Fig.15; col.2, ln.33-44);

(Claim 15) wherein sensing voltage comprises determining voltage signals in a time-domain (col.9, ln.8-17);

(Claim 16) wherein sensing voltage comprises determining voltage signals in a frequency-domain (col.9, ln.8-17; This is just a mathematical transform, and therefore contains equivalent physical knowledge as in claim 15.); and

(Claim 17) wherein the surface motion comprises surface displacement (col.2, ln.22-44, "movement").

**Claims 18, 19, 21, 32, 37-41, 43, and 44-47 are rejected under 35 U.S.C. 102(b) as being anticipated by Ivey.**

Ivey discloses a device for detecting changes in a spatially nonuniform optical intensity distribution incident on the device comprising:

(Claim 18) one or more areas of photoconductive material located between input electrodes for driving current, provided by a source, through the areas of photoconductive material (Fig.1; Fig.10; Fig.15); output electrodes for sensing a voltage drop across the areas of photoconductive material, the input electrodes being different from the output electrodes (Fig.10; Fig.15); one or more conductive paths connecting

the input electrodes and the output electrodes to the areas of photoconductive material to form a series circuit (Fig.10; Fig.15); and electronics connected to the output electrodes for determining a voltage across one or more of the areas of photoconductive material, a change in voltage being indicative of a change in optical intensity distribution (Fig.10; Fig.15; col.2, ln.33-67);

(Claim 19) the source comprising one of a constant current source, a voltage source (Fig.10; Fig.15), a time-varying current source, and a time-varying voltage source;

(Claim 21) the detector, source and electronics configured to provide a four-point measurement (Fig.10; Fig.15; These contain at least four sensors that each view different fields.);

(Claim 32) the photoconductive material comprising a semiconductor ("photodiode");

(Claim 37) further comprising resistive material disposed between the electrodes and the areas of photoconductive material ("photodiode");

(Claim 38) further comprising semiconductive material disposed between the electrodes and the areas of photoconductive material ("Photodiode");

(Claim 39) further comprising a mask to block incident optical radiation incident on at least one of the areas of photoconductive material (Fig.6, 57);

(Claim 40) the areas of photoconductive material comprising at least three active areas, wherein a first one of the active areas separates a first input electrode from a first output electrode, and wherein a second one of the active areas separates a second

input electrode from a second output electrode, such that current flows from the first input electrode through the active area and to the second input electrode, such that the first input and output electrodes do not short-circuit, and such that the second input and output electrodes do not short-circuit (Fig.10; Fig.15);

(Claim 41) the areas of photoconductive material forming one of a two-dimensional and three-dimensional array (Fig.15);

(Claim 45) wherein assessing relative position comprises assessing relative angles between the two objects, and wherein the change in the voltage indicates a change in the angular relationship between the objects (Fig.7);

(Claim 46) wherein measuring the voltage comprises measuring voltage ratios across the areas of photoconductive material to determine intensity ratios of the incident optical radiation (Fig.19); and

(Claim 47) further comprising comparing the time rate of change of the voltage across at least two areas of photoconductive material, a difference therein being indicative of spatial characteristics of the spatially nonuniform optical intensity distribution (Fig.19).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anagnostopoulos as applied above.

Anagnostopoulos is silent to cyclical variations in the voltage and utilizing an oscilloscope. However, measuring cyclical variations in the voltage to isolate one or more frequencies with signal strength above a noise floor utilizing an observation instrument such as a spectrum analyzer or an oscilloscope is well known in the art for the benefit of measuring dynamic systems in addition to static fields, and to gain data above the noise of short lived or varying fields. See, for example, US Patent 4,471,270

to Guyot. Further, the standard oscilloscope, such as that found in Guyot, operates in either a frequency domain setting or a transform thereof, such as in a time domain setting.

It would have been obvious to one of ordinary skill in the art at the time of invention to determine cyclical variations in the voltage utilizing an oscilloscope for the benefit of measuring dynamic systems in addition to static fields, and to gain data above the noise of short lived or varying fields.

**Claims 20 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ivey, as applied to claim 18 above, in view of US Patent 3,875,402 to Parkin.**

Parkin teaches the device wherein the electronics connected to the source and configured to modulate the source so that current is modulated through the areas at a desired frequency, to improve signal to noise. It would have been obvious to one of ordinary skill in the art at the time of invention to include the modulation of Parkin within the device of Ivey to improve the signal.

**Claims 24-27 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ivey, as applied to claim 18 and 41 above, in view of US 2003/0035111 A1 by Nevis.**

As to claims 24 and 25, Nevis, in the analogous art of optical alignment, teaches the advantage of using optical fibers. Optical fibers remove the need to mount the elements in fixed positions. Further, optical fibers decrease the difficulty of aligning the elements. Single mode fibers are advantageous over multimode fibers because the exhibit less dispersion, and increased spatial resolution. It would have been obvious to

one of ordinary skill in the art at the time of invention to incorporate the fibers of Nevis within the device of Ivey for the advantage of easier alignment and greater resolution.

As to claims 26 and 27, Ivey teaches expanding the laser light across the object measured (col.3, ln.33-36) using a bulk optic. This is the fiber-free configuration of the limitations of the claim. The motivation for incorporating the optical fibers here is the same as that of claims 24 and 25 above.

As to claim 42, Ivey teaches an array of photodetectors with a matching source (Fig.1). This is the fiber-free configuration of the limitations of the claim. The motivation for incorporating the optical fibers here is the same as that of claims 24 and 25 above.

***Conclusion***

Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice in this Office Action mailed. Applicant must seasonably challenge well known statements and statements based on personal knowledge when they are made by the Board of Patent Appeals and Interferences. See MPEP 2144.03 (a challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice). If applicant does not seasonably traverse the well-known statement during examination, then the object of the well-known statement is taken to be admitted prior art. In re Chevenard, 139 F.2d 71, 60 USPQ 239 (CCPA 1943). A seasonable challenge constitutes a demand for evidence made as soon as practicable during prosecution. Thus, applicant is charged

with rebutting the well-known statement in the next reply after the Office action in which the well-known statement was made.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott M. Richey whose telephone number is (571) 270-1296. The examiner can normally be reached on Monday - Thursday, 10:00 - 17:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Toatley can be reached on (571) 272-2059. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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